August 23, 2010

To: Jeff Appel

From: Jim Strait

Subject: Potential impact on LBNE of an extension of Collider Run II

As I am sure you know, the major risk for LBNE would be the potential diversion of funding to cover the cost of operating the Tevatron in FY12-14. The incremental LBNE funding in FY12 and FY13 relative to FY11, the years for which we have gotten guidance from DOE, is a large fraction of the expected savings from the completion of the collider run. Our profile guidance is $12M, $35M and $55M in FY11, 12 and 13 respectively, compared with expected savings from the end of Run II that are something like $30M and $40M in FY12 and 13 respectively, if I recall correctly what I am told.

However, your request for an impact statement tells us that, "Budget scenarios and impacts will come from the Director, and you should focus on physics, technology, competition, and schedule." In the following discussion on these latter topics, we have made the assumption that our funding would be unchanged by a decision to extend the collider run; that is, we assume that "new money" would be found for the collider run, and that it would not, therefore, be funded by slowing down new initiatives. If this assumption would turn out to be false, then the analysis below would be (grossly) incorrect and incomplete.

Under this assumption, the impact on LBNE would not be too large. The people currently working or planned to be working in the future on the detector systems (Near Detector, Water Cherenkov Detector, Liquid Argon) and on conventional facilities are generally not involved in collider operations, either on the accelerator or detector sides, nor are we counting on facilities that would remain tied up by an extension of the run. (Where we are unable to get the experts we want in these areas, it is essentially always because they are working on other projects which are not tied to the collider run.) I am sure that there will be second order effects, whereby people may get pulled off of LBNE, or not be available to LBNE, because the will be covering work that would otherwise be done by people rolling off of operations. However, we have no reason now to expect this to be a big effect.

The main impact would be on the beam design. With a delay in the NOvA work, certain people who are working on NOvA and LBNE could become

available to us sooner, but then be less available later. Properly handled, the impact of this should be small, but not zero. More importantly, we are counting on quite a number of people to work on the preliminary and final designs, who also have operational responsibilities. Among 15 individuals that are already working on LBNE part time, or who we plan to have do specific things, we would expect to lose about 5 FTEs until the extended run ended. Since for much of the future work, we do not yet have the exact people lined up, it is likely that there is an additional comparable number of currently unidentified FTEs that would also be diverted away from LBNE. The total would be, therefore, about 10 FTEs for 3 years. This represents about 20% of the planned effort during FY12-14, when we will be moving through CD-2 towards CD-3 around the end of FY14. Although the assumption here is that we will have the budget to hire this effort, if Run II were extended we would not have access to the right people to do the work. This would risk delaying CD-3 by, we estimate, up to 6 months.

An additional complication is that if we were able to hold to our current schedule, our CD-3 review would occur just before the beginning of the 8-month shutdown for ANU upgrade installation. If the 6-month delay estimated in the previous paragraph occurred, then our CD-3 review would be in the middle of the shutdown. Since some of our key experts on the primary and neutrino beams would also be involved in the shutdown, this would likely cause a further delay in our readiness for CD-3.

There is one potential positive effect on LBNE from extending the run. With a later shutdown, we would have time to prepare to make tunnel connections to the existing NuMI line and to the 8 GeV transfer line during that shutdown. This would decouple most civil construction and some beamline component installation for LBNE from accelerator operations after that, simplifying the LBNE project and potentially increasing NOvA running time. This, or course, supposes a CD-3a and adequate construction funding in FY14 and FY15 to execute this work early.

I hope that this gives you the information that you need. If you need additional information or clarification of anything in this note, please ask.

Cheers,
Jim